We claim:

1. Isolated, dimeric FAPα molecule, having a molecular weight of about 170 kilodaltons as determined by SDS-PAGE, wherein said dimeric FAPα molecule is capable of degrading extracellular matrix proteins.

2. The dimeric FAPα molecule of claim 1, wherein each monomer of said dimeric FAPα molecule consists of the amino acid sequence of SEQ ID NO: 2.

3. The dimeric FAPα molecule of claim 1, produced recombinantly.

4. The dimeric FAPα molecule of claim 3, produced by a eukaryotic cell.

5. Isolated protein consisting of:

(i) the FAPα catalytic domain, and

(ii) at least one portion of a non FAPα protein.

6. Method for cleaving a terminal dipeptide of formula Xaa-Pro from a molecule, comprising contacting said molecule with a second molecule, said second molecule having FAPα enzymatic activity.

7. The method of claim 6, wherein said second molecule is isolated, dimeric FAPα.

8. The method of claim 6, wherein said second molecule comprises an FAPα catalytic domain.

9. Method for identifying an enzyme inhibitor, comprising combining:

(i) a molecule having FAPα enzymatic activity;

(ii) a substrate for said molecule;

(iii) a substance believed to be an enzyme inhibitor; and

(iv) determining activity of (i) on (ii), wherein a decrease in activity when (iii) is present as compared to activity when (iii) is absent indicates that said substance is an enzyme inhibitor.

10. The method of claim 9, wherein said molecule is isolated dimeric FAPα.

11. The method of claim 9, wherein said molecule comprises an FAPα catalytic domain.

12. Method for treating a subject with a pathological condition characterized by FAPα expression, comprising administering to said subject an amount of a FAPα inhibitor sufficient to inhibit enzyme activity of FAPα.

13. The method of claim 12, wherein said inhibitor is a monoclonal antibody.

14. The method of claim 12, wherein said inhibitor is a collagen derivative.

15. The method of claim 12, wherein said pathological condition is a cancer.